Arizona State Library, Archives and Public Records

Media Storage and Handling of Long Term and Permanent Records Guidelines

Last Updated April 2013

Polly Rosenbaum Building

Arizona State History and Archives Department
1901 W. Madison, Phoenix, AZ 85009
602.926.3720

The recommendations in this brochure are intended as guidance only. The Arizona State Library, Archives and Public Records does not assume responsibility or liability.

For questions or comments please contact the Arizona State Archives at 602.926.3720 or archives@azlibrary.gov .

Table of Content

General Preservation

There are several key components that affect the preservation of media.

Due to the inherent instability of analog and electronic records, no file format or storage media is permanent. All media formats including paper and microfilm are susceptible to degradation, corruption and inadvertent destruction.

- **Light** – Light accelerates the deterioration of materials. It is best to store materials in the dark. Media is vulnerable to degradation due to light exposure.
- **Temperature** – Cooler temperatures are best for media. Temperature that is too cold or too hot will damage the media. The general rule is 50 to 70 degrees Fahrenheit, check specific media recommendations.
- Keep records at a steady temperature as fluctuating temperature will cause the media to expand and contract, thus damaging the media.
- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance.
- **Humidity** – Recommendations run from 20% to 45% relative humidity. The materials that make up the physical media are also susceptible to damage such as rust. Fluctuating humidity can damage material.
- **Pollutants** – Particulate and gaseous contaminants such as dust, dirt, mold, smoke and other gases can damage media especially during the reading of the materials. You can minimize particulate contamination with a filter system.
- **Handling** – Minimize handling and use of archival media. Make a master copy of the original and one or two use copies, as a minimum.
- Wash and dry hands thoroughly before handling media. Do not use lotions or sanitizers prior to working with any media.
- Wear white, clean, lint free cotton gloves when possible.
- Clean work surfaces before handling materials.
- Never touch the media directly, handle by the case.



- **Shelving** – Refrain from using wood shelving for storage. Items should be stored 4” to 6” off of the ground. Do not stack boxes or containers more than 5 high. Weight from upper items can damage lower items.
- **Labeling** – Ensure media boxes are clearly labeled with record series, inclusive dates and index location.
- **Creating** – Verify all records are readable, meet quality standards and are complete.

References

National Parks Service – Conserve O Grams
http://www.nps.gov/history/museum/publications/conserveogram/cons_toc.html

Care and Handling of Alternative Media
http://www.lib.ucdavis.edu/dept/preservation/altmedia.php

Cylinder, Disc and Tape Care in a Nutshell
http://www.loc.gov/preservation/care/record.html

Digital Preservation Coalition
http://www.dpconline.org/graphics/index.html

Conservation OnLine (CoOL)
http://cool.conservation-us.org/

Northeast Document Conservation Center (NEDCC) – Preservation Leaflets
http://www.nedcc.org/resources/leaflets.list.php

Memory of the World: Safeguarding the Documentary Heritage
http://www.unesco.org/webworld/mdm/administ/en/guide/guidetoc.htm

Image Permanence Institute (IPI)
https://www.imagepermanenceinstitute.org

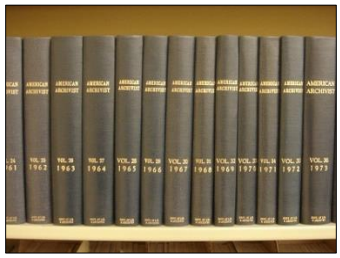
IFLA – Principles for the Care and Handling of Library Material
http://www.ifla.org/VI/4/news/pchlm.pdf

Books

Storage:

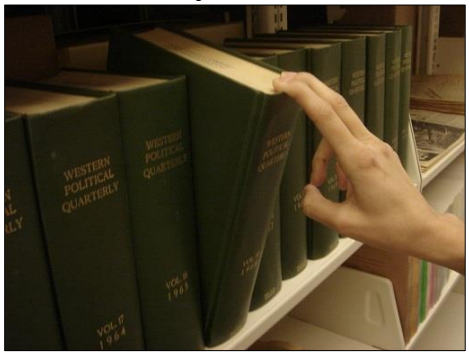
Temperature (Fahrenheit)	Relative Humidity (RH)
65°	35% – 45% ± 5%

- Stand upright, flat or spine down.
- Place damaged books in enclosures just larger than the size of the book, so that book fits snugly.
- Tie loose materials with flat cotton tape.
- Remove moldy books from collection immediately. Contact a conservator for remediation immediately.
- Avoid storing books in areas with lots of lighting.
- Keep area and books clean, dust regularly.
- Do not allow books to lean while in storage and store books of comparable size together.

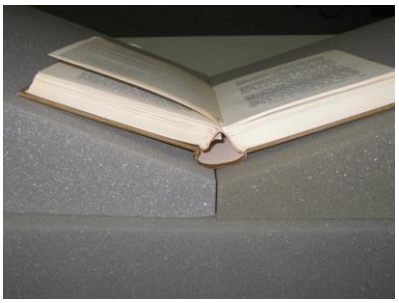


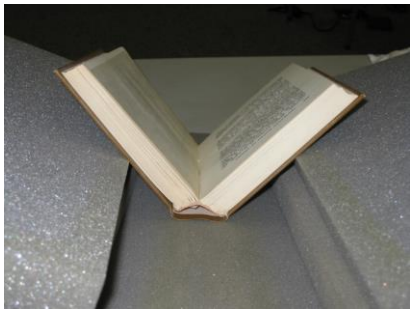
Care and Handling:

- Remove book by text block or sides.

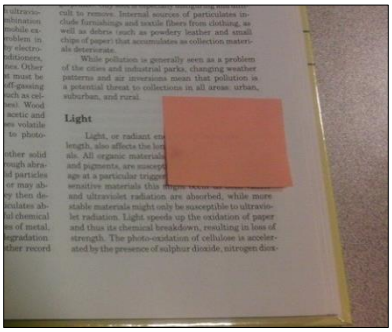


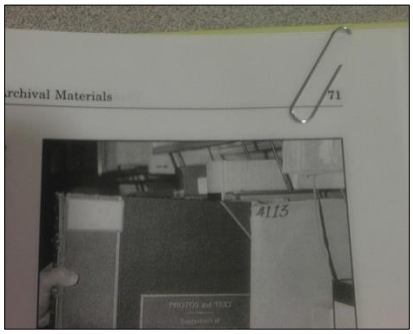
- Support book spines and covers while open, decreasing the opening angle as much as possible.





- Do not use post-it notes, paperclips, double sided tape, or pressure sensitive tape on pages, as this can cause damage to the book.





References

Harvard Library – Collections Care
http://preserve.harvard.edu/care/index.html

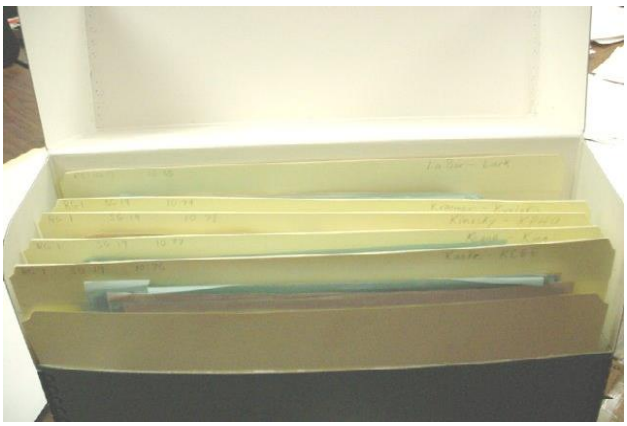
Library of Congress – Care, Handling, and Storage of Books
http://www.loc.gov/preservation/care/books.html

Small Print – Letter and Legal sized records

Storage:

Temperature (Fahrenheit)	Relative Humidity (RH)
70° - 55°	35% – 45% ± 2%

- Store items in folder and folders within a box; all of which aid in protecting against environmental factors.
- Store items in area where temperature, humidity, air pollutants, etc. can be best controlled.
- Store objects of the same type and size together.
- Do not overfill boxes.
- Support folders in boxes that are not filled to prevent warping and damage.



Care and Handling:

- Lay flat when viewing.
- Unroll, unfold or flatten with humidity and/or weights (Refer to Conservator).

References

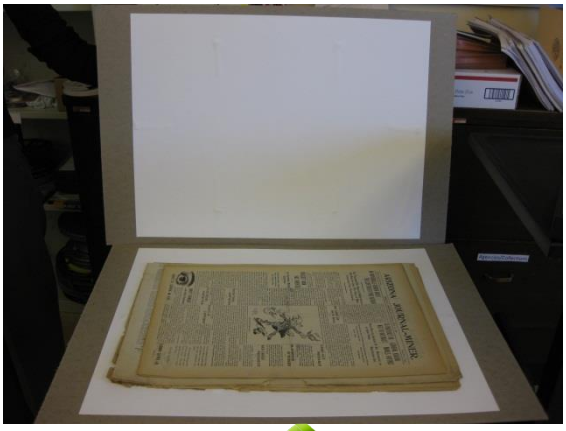
General Commission on Archives & History – Archival Leaflet Series
http://www.gcah.org/site/c.ghKJI0PHIoE/b.3644151/

Large Print – Newspapers, maps, blueprints

Storage:

Temperature (Fahrenheit)	Relative Humidity (RH)
70° - 55°	35% – 45% ± 2%

- Store items in folder and folders in a map case or box or wrap if map case is not available; all of which aid in protecting against environmental factors. Frequently used items should be stored in boxes with covers whose depth is the same as the base, if map cases are unavailbale. Items used less frequently may be wrapped in alkaline paper.
- Store items in area where temperature, humidity, air pollutants, etc. can be best controlled.
- Store objects of the same type and size together.
- Do not overfill boxes.
- Do not stack more than 5 boxes or containers. Weight can damage lower items.



Care and Handling:

- Lay flat and unfold. Unroll, unfold or flatten with humidity and/or weights (Refer to Conservator).
- When removing from storage, remove top items first.
- Encapsulate commonly used items using stable, archival, polyester film and archival approved double-sided tape Consult with a conservator prior to encapsulation.

References

Library of Congress – Preserving Newspapers
http://www.loc.gov/preservation/care/newspap.html

General Commission on Archives & History – Archival Leaflet Series
http://www.gcah.org/site/c.ghKJI0PHIoE/b.3644151/

Motion Picture Film

Storage:

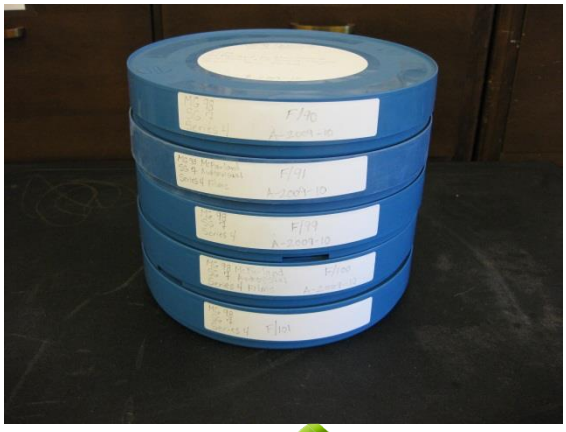
	Temperature (Fahrenheit)	Relative Humidity (RH)
Acetate and Polyester	40° – 50°	20% – 40%
Cellulose Nitrate	36°	20% – 30%

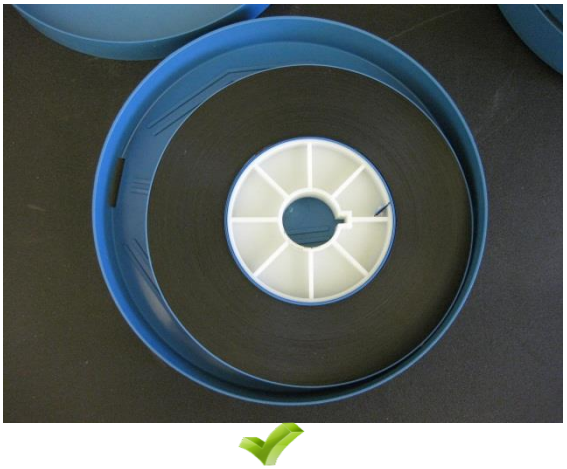
Note: In addition, film can be frozen (32°F) to extend the life of the material. Care must be used with this type of storage and gradual thawing of the film prior to use.

- Common sizes: 8mm, 16mm, 35mm
- Do not store film in areas where environmental factors may affect film such as near heaters, sprinklers, direct sunlight, or in areas where humidity cannot be controlled.
- Excessive dryness can lead to brittle film.
- Excessive dampness can lead to mold growth.
- Store in cans made of polyester, polyethylene, polypropylene, anodized aluminum or stainless steel.
- Store cans horizontally if cored or on undamaged reel with even film pack and vertically if on damaged reel and film pack is uneven.
- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance

Storing Nitrate film:

- Store in steel cabinets with sprinkler system and venting.
- Store at appropriate temperature and relative humidity as noted above.
- Follow The National Fire Protection Association (NFPA) guidelines and local fire department policies for storage of Nitrate film.





Care and Handling:

- Avoid viewing film on projectors as the light and spokes can be damage the film.
- Handle the film by the edges. Never touch the surface of the film.
- Transfer film to core (plastic centerpiece that film is stored on) instead of the metal reels (prone to rust) for long term storage.

References

The National Film Preservation Board
http://www.loc.gov/film

The Film Preservation Guide: The Basics for Archives, Libraries, and Museums
http://www.filmpreservation.org/preservation-basics/the-film-preservation-guide-download

The Home Film Preservation Guide
http://www.filmforever.org

National Film and Sound Archive – Australian Film Commission
http://www.nfsa.gov.au/preservation/

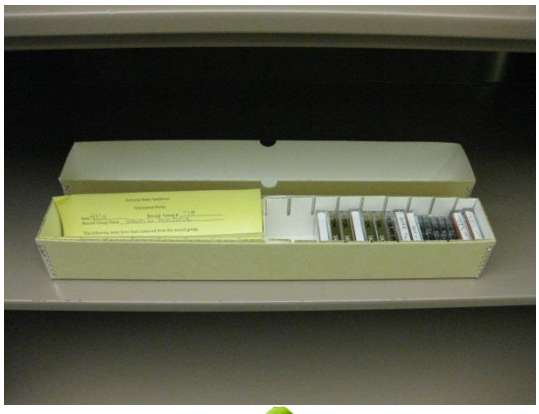
Hollywood Vaults – Check out the resources list
http://www.hollywoodvaults.com/resources/

Magnetic Media - Video, data, audio

Storage:

Temperature (Fahrenheit)	Relative Humidity (RH)
59° – 68°	25% – 40%

- Store tape vertically, in its proper container.
- Never store tape at less than 46° F, as it will cause damage to the tape.
- Store in areas where environmental conditions such as heat, light, humidity, and dust will least likely affect the media.
- Floppy disks/diskettes should be secured in non-abrasive envelopes.



Care and Handling

- Wash and dry hands thoroughly and/or wear protective gloves when handling media.
- Handle magnetic tape and disks by the protective cases. Do not touch the tape or disk directly.
- Write labels prior to affixing. Labels should be placed on the protective case only.

- Always rewind completely.
- Keep away from magnetic fields.
- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance

References

Magnetic Tape Storage and Handling: A Guide for Libraries and Archives
http://www.digitaldeliftp.com/Images/pdfs/AP_NMLdoc_magtape_S_H.pdf

Protecting and Handling Magnetic Media – National Archives of Australia
http://www.naa.gov.au/records-management/agency/preserve/physical-preservation/magnetic-media.aspx

The Preservation of Magnetic Tape Collections: A Perspective, Final Report to NEH
https://www.imagepermanenceinstitute.org/webfm_send/303

Predicting the Life Expectancy of Modern Tape and Optical Media by Viveek Navale
http://ebookbrowse.com/gdoc.php?id=202715353&url=bfcc21dd6acf9abfd219d07c0ff29717

Sound Directions (Harvard & Indiana University)
http://www.dlib.indiana.edu/projects/sounddirections/papersPresent/index.shtml

Vermont Folklife Center http://www.vermontfolklifecenter.org/archive/preservation-resources.shtml

International Association of Sound & Audiovisual Archives http://www.iasa-web.org/

UC Davis - Care and Handling of Alternative Media
http://www.lib.ucdavis.edu/dept/preservation/altmedia.php

Texas Commission on the Arts – Video Identification & Assessment Guide
http://www.arts.texas.gov/wp-content/uploads/2012/04/video.pdf

Damage Mitigation and Recovery, Magnetic Media by Peter Brothers
http://www.archives.gov/preservation/conservation/magnetic-media.html

Videotape Preservation by Jim Wheeler
http://www.amianet.org/resources/guides/WheelerVideo.pdf

The Association of Moving Image Archivists – manuals, Q&As and Fact Sheets
http://www.amianet.org/resources/guides/video_q&a.pdf
http://www.amianet.org/resources/guides/fact_sheets.pdf

AHDS Preservation Handbook: Digital Audio
http://www.ahds.ac.uk/preservation/audio-preservation-handbook.pdf

Best Practice Guidelines for Digital Collections at University of Maryland Libraries
http://ourdigitalworld.org/wp-content/uploads/2012/04/DigitizationBestPractices_Schreibman.pdf

Capturing Analog Sound for Digital Preservation: Report of a Roundtable Discussion of Best Practices for Transferring Analog Discs and Tapes – March 2006
http://www.clir.org/pubs/reports/pub137/pub137.pdf

CDP Digital Audio Working Group – Digital Audio Best Practices, V2.1 – October 2006
http://www.mndigital.org/digitizing/standards/audio.pdf

Care, Handling and Storage of Removable Media – National Archives United Kingdom
http://www.nationalarchives.gov.uk/documents/information-management/removable-media-care.pdf

Microfilm and Microfiche

Storage:

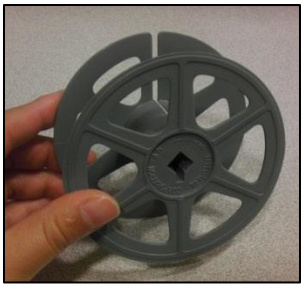
Type	Temperature (Fahrenheit)	Relative Humidity (RH)
Master Negatives *	46° – 54°	30% – 40%
Use Copies	64° – 68°	45% – 55%

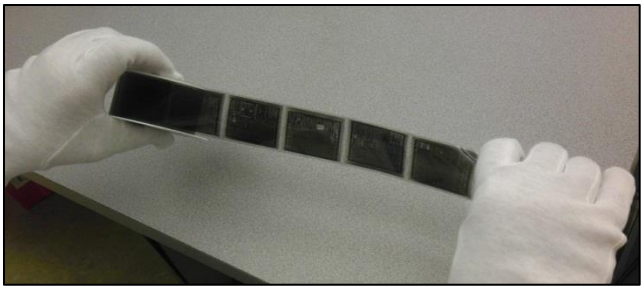
* Camera original (first generation) film

- Store microfiche in acid/lignin free individual envelope or box.

Care and Handling:

- Allow the cold film to reach room temperature before using it. This will typically require a minimum of 24 – 48 hours. Sudden temperature change may cause moisture condensation on the surface of the films.
- Keep microfilm on inert plastic reel in acid/lignin free boxes. Metal reel can scratch and rust.
- Wear cotton gloves when handling, especially master negatives.
- Handle by the edges or leaders of microfilm, and by the header of microfiche to prevent scratching the surface of the film.





- To prevent scratching the film, make sure the film glass over the film carrier of the microfilm reader is up when rewinding the microfilm. **Note:** Do not use the microfilm reader for viewing a Master Negative, this material scratches very easily. Use an eye

loupe or a light table. Master negatives are not for access, only for making duplicate masters or use copies of film.

- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance.

References

Northeast Document Conservation Center (NEDCC) – Preservation Leaflets
http://www.nedcc.org/resources/leaflets/6Reformatting/01MicrofilmAndMicrofiche.php

RLG Preservation Microfilming Handbook
http://cdm15003.contentdm.oclc.org/utils/getfile/collection/p267701coll33/id/262/filename/263.pdf

National Parks Service – Conserve O Grams: Planning and Managing a Microfilming Project for Preservation And Access
http://www.nps.gov/museum/publications/conserveogram/19-25.pdf

Naviant: Microfilm Storage Dos & Don'ts
http://www.naviant-inc.com/uploads/services/microfilm-storage-tip-guide.pdf

Photographs

Storage:

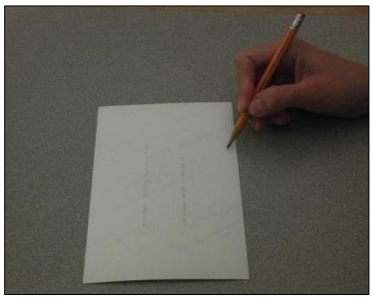
Type	Temperature (Fahrenheit)	Relative Humidity (RH)
Most Photographs	64° – 68°	20% – 40%
Film based negatives, Glass negatives, Color Photographs	30° – 40°	30% – 40%

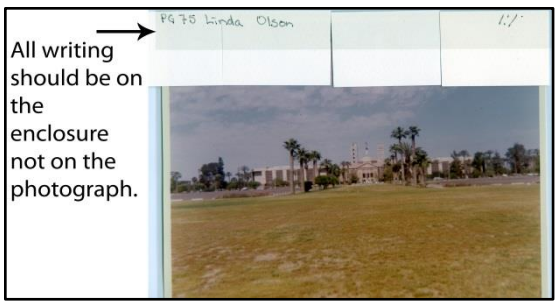
Note: Colder temperatures can minimize damage rate of high humidity

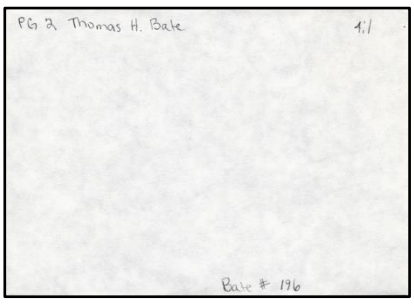
- Store film based negatives in buffered (alkaline, pH 7.5 – 9.5) enclosures. For other materials use unbuffered (neutral, pH 7) enclosures. Enclosures protect photographs from dust, light and physical damage.
- Keep in mind that photographs are susceptible to damage from high and low temperatures and changes in relative humidity.
- Place glass negatives and lantern slides in individual four flap enclosures to avoid scratches and store them upright in a sturdy box.

Care and Handling:

- Do not use magnetic or self-adhesive albums to store photographs as this will damage the photographs.
- Do not write on photographs. All identification of photographs should be on the enclosure NOT on the photograph.







- Wash hands before working on photographs. It is important to not use lotion or hand sanitizer on hands.
- Handle photographs and negatives by their edges to avoid touching the surface.
- When handling glass plates negatives and lantern slides it is advisable to wear nitrile gloves rather than white cotton gloves. Nitrile gloves protect the glass plate while reducing the chance of dropping the image.
- Glass plate negatives and lantern slides are especially susceptible to damage from fluctuating temperatures. Keep them at a constant temperature to reduce the expansion and contraction of the glass.
- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance.

References

Library of Congress – Care, Handling, and Storage of Photographs
http://www.loc.gov/preservation/care/photo.html
http://www.loc.gov/preservation/resources/care/photolea.html

Caring for Your Photographs
http://www.conservation-us.org/index.cfm?fuseaction=Page.viewPage&pageId=633&parentID=497

NEDCC Preservation Leaflets – Care of Photographs
https://www.nedcc.org/resources/leaflets/5Photographs/03CareOfPhotos.php

NEDCC Preservation Leaflets – Storage Enclosures for Photographic Materials
http://www.nedcc.org/resources/leaflets/4Storage_and_Handling/11StorageEnclosures.php

National Parks Service – Conserve O Grams: Buffered and Unbuffered Storage Materials
http://www.nps.gov/museum/publications/conserveogram/04-09.pdf

A Consumer Guide to Traditional and Digital Print Stability
https://www.imagepermanenceinstitute.org/webfm_send/313

The Permanence of Care of Color Photographs: Traditional and Digital Color Prints, Color Negatives, Slides, and Motion Pictures by Henry Wilhem 1993
http://www.wilhelm-research.com/pdf/HW_Book_758_Pages_HiRes_v1a.pdf

National Library of New Zealand – Preserving Photographs
http://www.natlib.govt.nz/services/get-advice/preservation/preserving-physical-photographs

Optical Discs – Compact Discs (CDs), Digital Versatile/Video Disc (DVDs), and Magnet-optics (MOs)

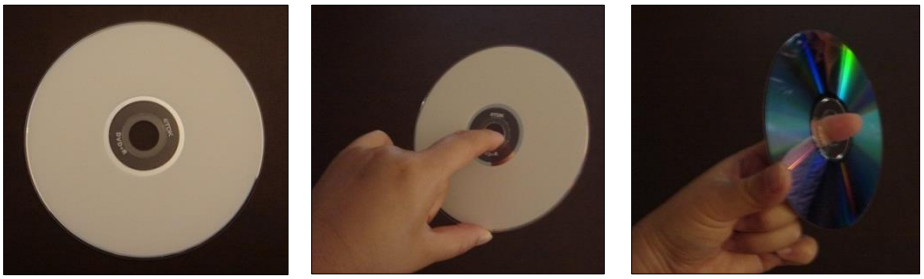
Storage:

Temperature (Fahrenheit)	Relative Humidity (RH)
40° – 68°	20% – 50%

- Store discs in cases or specialized non-abrasive envelopes. Make sure the surface of the disc does not touch the surface of the case.
- Store discs vertically.

Care and Handling:

- Handle discs by the edge or the center hole. Do not touch the surface.
- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance.
- Do not write or apply label to surface of the disc. Chemicals in the ink and adhesive can leach into the disc and cause damage. Apply label or writing to the clear center portion of the disc.



The life expectancy of CDs and DVDs varies greatly from 2 years and up. Materials used in the creation of this media and the equipment quality to write to this media fluctuate greatly. It is best to test readability frequently and copy to a new media at a minimum every 3 to 5 years.

Note: Magnetic Optical and Ultra Density Optical disks have greater life expectancy, than CDs and DVDs.

References

Digital Media Group (DMG) – CD and DVD Archiving – Quick Reference Guide for Care and Handling
http://www.itl.nist.gov/iad/894.05/docs/disccare.html

Predicting the Life Expectancy of Modern Tape and Optical Media by Viveek Navale
http://ebookbrowse.com/gdoc.php?id=202715353&url=bfcc21dd6acf9abfd219d07c0ff29717

Memory of the World Programme: Risks Associated with the Use of Recordable CDs and DVDs as Reliable Storage Media in Archival Collections – Strategies and Alternatives – October 2006
http://unesdoc.unesco.org/images/0014/001477/147782e.pdf

The Relative Stabilities of Optical Disc Formats by Joe Iraci
http://cool.conservation-us.org/coolaic/sg/emg/library/pdf/iraci/relativeStabilitiesOpticalDiscs.pdf

Care and Handling of CDs and DVDs – A Guide for Librarians and Archivists
http://www.clir.org/PUBS/reports/pub121/pub121.pdf

NIST Special Publication 500-263 – NIST/Library of Congress Optical Disc Longevity Testing Procedure – November 2005
http://www.itl.nist.gov/iad/894.05/docs/Public%20SP%20500-263%20November%202005.pdf

NIST Special Publication 500-252 – Care and Handling of CDs and DVDs – A Guide for Librarians and Archivists
http://www.itl.nist.gov/iad/894.05/papers/CDandDVDCareandHandlingGuide.pdf

Preserving CDs and DVDs
http://www.naa.gov.au/records-management/agency/preserve/physical-preservation/CDs-and-DVDs.aspx

Long Plays (LPs)

Storage:

Temperature (Fahrenheit)	Relative Humidity (RH)
45° – 50°	45% – 50%

- Store vertically to prevent warping. Use a cardboard insert to backfill storage box so that LPs do not slant.

Care and Handling:

- Handle by edge and center (label) portion of the record.
- Do not touch the playing surface.
- Clean from the center out with a soft lint free cloth.
- Media, other than paper, must acclimate to room temperature and humidity prior to use, usually 24 to 48 hours. This time can vary due to media type and temperature variance.

References

The Care and Handling of Recorded Sound Materials
http://cool.conservation-us.org/byauth/st-laurent/care.html

The Records Collector Guild
http://www.recordcollectorsguild.org/

Preservation Week: Caring for Your LP Records
http://atyourlibrary.org/passiton/preservation-week-caring-your-lp-records

Caring For Your CDs and Vinyl
http://www.linnrecords.com/linn-vinylcare.aspx

Standards and Guidelines for Records and Media

Association for Information and Image Management (AIIM)
http://www.aiim.org/documents/standards/ARP1-2009.pdf

American National Standards Institute (ANSI)
http://www.ansi.org
ANSI Z39.50 – American National Standards Institute

Association of Records Managers and Administrators, Inc. (ARMA)
http://www.arma.org/standards/index.cfm
ANSI/ARMA 9-2004 – Requirements for Managing Electronic Messages as Records
ANSI/ARMA 5-2003 – Vital Records Programs: Identifying, Managing, and Recovering Business-Critical Records

Department of Defense
http://www.dtic.mil/whs/directives
DoD 5015.2 – Department of Defense Records Management Program

International Council on Archives Standards
http://www.ica.org/index.php?plangue=eng

ISAD(G) – General International Standard Archival Description, 2Ed. 1999 ISAAR(CPF) – International Standard Archival Authority Record for Corporate Bodies, Persons, and Families, 2Ed. 2004

International Standards Organization
http://www.iso.org/iso/home

ISO 9000 series – Quality assurance ISO 9660 – CD-ROM Standard ISO 11799:2005 Information and documentation – Document storage requirements for archive and library materials ISO 14721 – Open Archival Information Systems Reference Model ISO 15489 – Management of Records (Ref SC State Archives) ISO 19005, Document management – Electronic document file format for long-term preservation – Part 1 PDF ISO 20652:2006 Space data and information transfer systems – Producer – archive interface – Methodology abstract standard

Internet Society (ISOC)
http://www.internetsociety.org/who-we-are
http://www.rfc-editor.org/rfcxx00.html
RFC 822 -Standard for the format of ARPA Internet text messages RFC 2822 – Internet Message Format Standards

NARA
http://www.archives.gov/about/regulations
Subchapter A – General Rules (Parts 1200 – 1210) Subchapter B – Records Management (Parts 1220 – 1238)

Northeast Document Conservation Center (NEDCC)
http://www.nedcc.org/home.php

National Institute of Standards and Technology (NIST)
http://www.nist.gov

Information Access Division
http://www.itl.nist.gov/iaui/

Information Technology Laboratory
http://www.nist.gov/itl/

NIST Virtual Library
http://www.nist.gov/nvl/

Federal Government

National Archives and Records Administration (NARA)
http://www.archives.gov/era

General Accounting Office (GAO)
http://www.gao.gov/index.html

Library of Congress (LOC) Digital Preservation
http://www.digitalpreservation.gov/index.html

Professional Organizations

Association for Information and Image Management (AIIM)
http://www.aiim.org

Association of Moving Images Archivists (AMIA)
http://www.amianet.org/about/mission.php

Association of Records Managers and Administrators (ARMA)
http://www.arma.org/
http://www.arma.org/erecords/index.cfm (Electronic Records Section)

Association for Recoded Sound Collections (ARSC)
http://www.arsc-audio.org/index.html

Council on Library and Information Resources (CLIR)
http://www.clir.org/
Council of State Archivists (COSA)
http://www.statearchivists.org/

International Federation of Library Associations and Institutions (IFLA)
http://www.ifla.org/

Society for Imaging Science and Technology (IS&T)
http://www.imaging.org/

National Association of Government Archives and Records Administrators (NAGARA)
http://www.nagara.org/

Image Permanence Institute
http://www.imagepermanenceinstitute.org

Optical Storage Technology Association (OSTA)
http://www.osta.org/

Society of American Archivists Government Records Section (SAA)
http://www.archivists.org/saagroups/gov/index.asp

List Servs

Association of Moving Images Archivists (AMIA-L)
http://www.amianet.org/participate/listserv.php

Arizona Archives
AZArchives@lists.lib.az.us

DigiPres -The Preservation and Reformatting Section (PARS) of the Association for Library Collections and Technical Services (ALCTS) division of the American Library Association (ALA)
http://lists.ala.org/wws/info/digipres

Society of American Archivists (SAA) has multiple lists – depending on area of interest
http://www.archivists.org/listservs/index.asp (Electronic Records, Visual Material)

Association of Recorded Sound Collections (ARSCLIST)
http://www.arsc-audio.org/arsclist.html

ARMA Records Management
http://www.arma.org/rim/listserv.cfm

ARMA Electronic Records
http://www.arma.org/erecords/listserv.cfm

Appendix I – Storage Temperature and Relative Humidity

Type of Materials	Temperature (Fahrenheit)	Relative Humidity (RH)
Books	65°	35% – 45% ± 5%
Large Print	65°	35% – 45% ± 5%
Motion Picture Film: Acetate and Polyester	40° – 50°	20% – 40%
Motion Picture Film: Cellulose Nitrate	36°	20% – 30%
Magnetic Media	59° – 68°	25% – 40%
Microfilm and Microfiche: Master Negatives	46° – 54°	30% – 40%
Microfilm and Microfiche: Use Copies	64° – 68°	45% – 55%
Photographs	64° – 68°	20% – 40%
Film based negatives, Glass negatives, Color Photographs	30° – 40°	30% – 40%
Optical Discs	40° – 68°	20% – 50%
Long Plays (LPs)	45° – 50°	45% – 50%